

Table 1 - Revision History

Version	Date	Description
Initial release	2 Oct 2012	First Draft
comments	6 Nov 2012	Incorporated comments from reviewers

1 Scope

The overall scope of video test and measurement is much larger than what is addressed in this document.

The topic of video system calibration, test, and measurement spans the end-to-end system from glass-to-glass. It also spans the development cycle from research stage through specification, acceptance testing, operational deployment and maintenance as shown in Figure 1. Each part of the system at each phase of its lifecycle has metrics. Measurement techniques can vary. For example, in-service measurement during operational missions has very unique requirements.

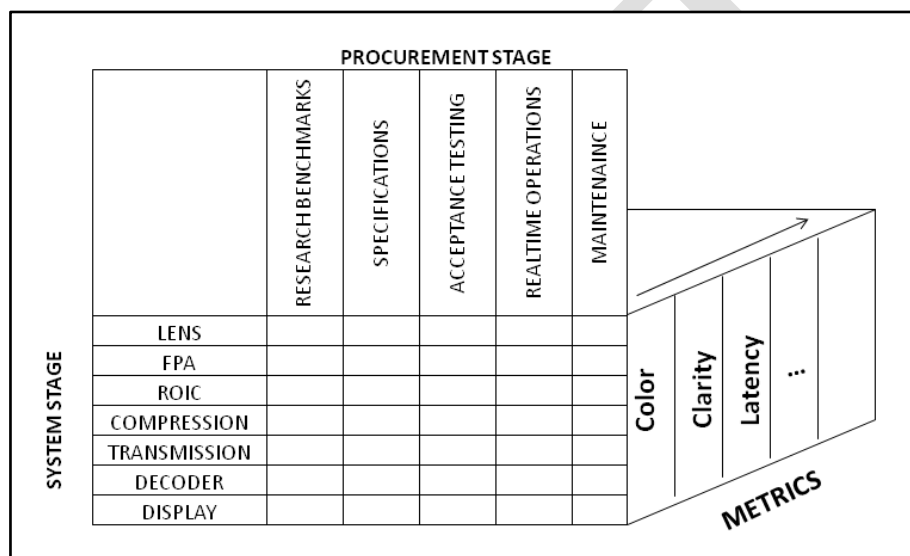


Figure 1. Overall Scope of Video Test and Measurement

The commercial broadcast industry has many standards and methods that can be leveraged by the DoD community. Future Engineering Guidance is expected to take advantage of these resources to address the complete scope depicted in the figure.

This Engineering Guideline only addresses a narrow aspect of the overall topic. Future work will enlarge guidance to address more aspects.

This EG provides a file and metadata nomenclature for injected video test sequences.

Nothing in this document precludes the use of commercial video test sequences provided each frame is labeled. This is needed to align the compressed output to the reference input without ambiguity.

Video test sequences are injected prior to compression, and data transmission.

It is envisioned that the video test sequences will be designed to identify :

1. Test basic picture decoding performance
2. Mosquito Noise
3. Correct signal amplitude range (e.g 16-235 in an 8-bit digital system)

4. Measure noise artifact corruption (PSNR and SSIM)
5. Detect Color bleeding due to motion estimation (hue differences around moving sprites)
6. Measure MPEG compression effects (blockiness metric)
7. Measure judder and missing frames (frame label)
8. Test a system's frequency response (frequency ratio)
9. Test vertical vs.to horizontal resolution equality (H and V bars)
10. Test Color Space (Rec. 601 versus 709)

2 References

Recommendation ITU-R BT.709-5, "Parameter Values for the HDTV standards for production and international program exchange"

3 Test Sequence Nomenclature

The test sequence nomenclature is indicated four ways:

1. The test sequence ID is partPortion of the file name, followed by color sampling format, followed by spatial dimensions and temporal frame rate.

Example: cal422_1920_1280_60_001.yuv is the file name for a 422 chroma subsampled, 1920 x 1080 , 60 FPS test sequence with identification number 001. A change in format or frame rate does not alter the identification number.

2. The test sequence ID is burned into each calibration frame as a text string.
3. The test sequence ID is burned into each calibration frame as a QR-code (optional)
4. Each frame is uniquely labeled
5. The test sequence ID is included in the metadata.

Each frame is labeled (burned in) with the frame number as a text and QR-code representation.

4 Calibration Metadata Keys

Table 2 – Calibration Pack

NAME		KEY
CALIBRATION Pack		TBD
	Constituent Keys	

Name	Tag	Key	Units/Range	Format	Bytes
POSIX Microseconds Time Stamp of Last Frame in Sequence	1	06.0E.2B.34.01.01.01.01. 0E.01.02.03.54.00.00.00	micro-secs	UINT64	8
Sequence Duration in Frames	2	06.0E.2B.34.01.01.01.01. 0E.01.02.03.55.00.00.00	0- 65536 frames	UINT16	2
POSIX Microseconds Calibration Pack Creation	3	06.0E.2B.34.01.01.01.01. 0E.01.02.03.56.00.00.00	micro-secs	UINT64	8
POSIX Calibration Sequence ID	4	06.0E.2B.34.01.01.01.01. 0E.01.02.03.57.00.00.00	0-255	UINT8	1

4.1 Time Stamp of Last Frame in Sequence

06.0E.2B.34.01.01.01.01.0E.01.02.03.54.00.00.00

The time stamp of the last frame in the rating sequence is the frame with the greatest time stamp value.

4.2 Sequence Duration

06.0E.2B.34.01.01.01.01.0E.01.02.03.55.00.00.00

The test sequence duration is expressed in frames. The maximum value is 65535.

4.3 Calibration Pack Creation Time

06.0E.2B.34.01.01.01.01.0E.01.02.03.56.00.00.00

The Calibration Pack Creation time is the current time when the calibration key value(s) are inserted into the stream. The reason for this key is to indicate the delay between the metadata calibration indication and the calibration data. Note the delay can be negative when the metadata is inserted before the calibration event happens. That is, if the Calibration Pack Creation Time (Tag 3) is less than the Time Stamp of the Last Frame in Sequence (Tag 1), then the metadata message is a prediction of when the calibration sequence will end. This alternative is provided to enable receiving equipment to prepare for receipt of video test sequences in realtime. The predicted start time of the test sequence can be calculated by taking into account the “Sequence Duration” metadata value.

4.4 Calibration Sequence ID

06.0E.2B.34.01.01.01.01.0E.01.02.03.57.00.00.00

The calibration sequence ID is the last three digits in the filename of the sequence. It is anticipated that various test sequences will span the range of test requirements.

DRAFT